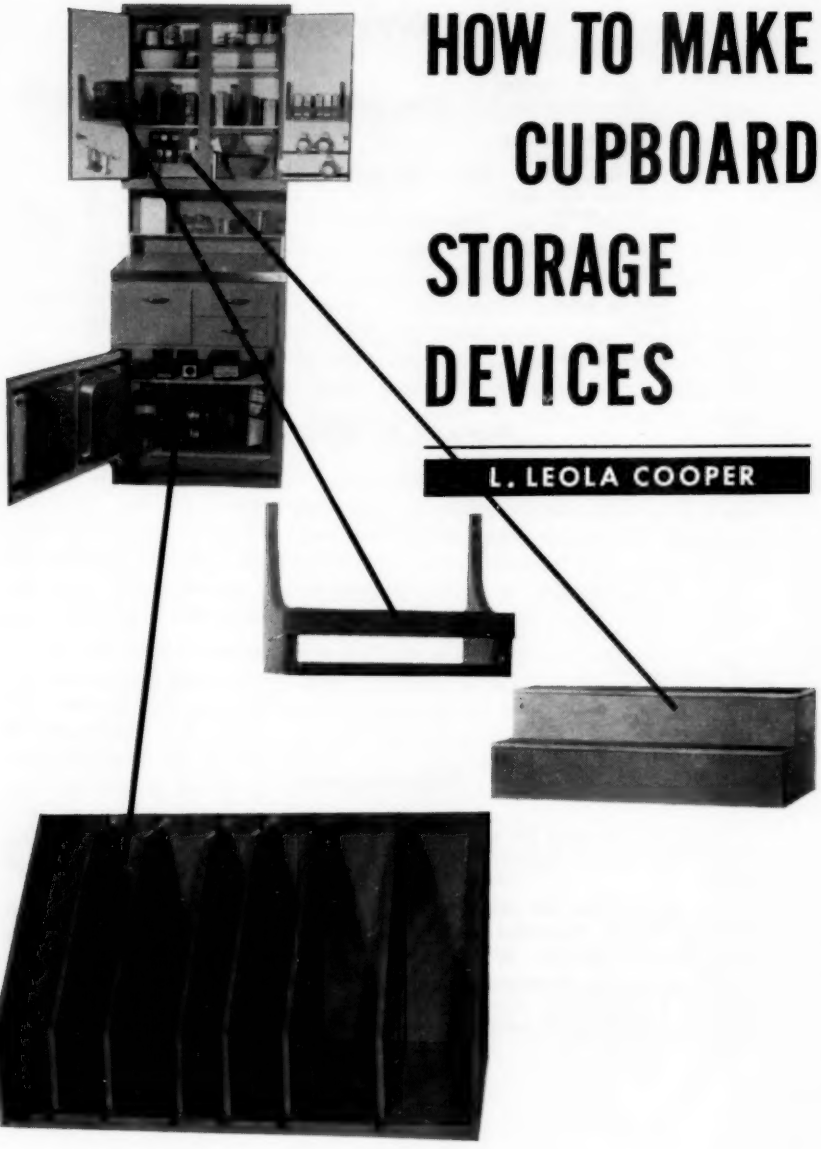
CORNELL EXTENSION BULLETIN 859



HOW TO MAKE CUPBOARD STORAGE DEVICES

L. LEOLA COOPER

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Reprinted AUGUST 1954

Acknowledgment

Many of the ideas for storage devices described here are from an earlier Cornell Extension Bulletin by Clara E. Jonas. This bulletin is now out of print.

The designs for the storage devices are based on the principles of convenient storage described in Extension Bulletin 703, *Kitchen Cupboards that Simplify Storage,* by Mary Koll Heiner and Helen E. McCullough.

The planning necessary to determine storage needs, as described in Extension Bulletin 811, *Centers for Your Work and Leisure,* by Ella M. Cushman, was kept in mind as this present bulletin was written.

How to Make Cupboard Storage Devices

L. LEOLA COOPER

WORKING in a kitchen is a satisfying and creative activity for many women; yet some do not get the greatest possible pleasure from kitchen work because of unnecessary reaching, bending, and handling of supplies. Many of these waste motions could be eliminated if available storage space were used to better advantage. Frequently there is waste space in cupboards and other storage areas at the easiest-to-reach height. In many old homes there is plenty of cupboard space, but it is not convenient because the shelves are far apart and the drawers are deep. To pick up or move several articles in order to get the one wanted takes extra time and energy.

It is possible for the homemaker to have storage areas in her kitchen attractive and easy to use even though the cupboards are old or even if she lives in a rented house. The ideas and designs presented here are suggestions for making the storage areas in the home more functional. No measurements are given for the storage devices since the articles to be stored and the space in which they are stored will differ from home to home.

You may wish to try out plans for improving your storage space by making shelves and racks from scraps of lumber or wooden crates. Because so little expense is involved in making these articles you may experiment with several plans to see which one best suits your needs. When you have decided which of the wooden devices will make your storage most convenient, you can smooth the wood with sandpaper and finish the devices so that they are neat in appearance. Many an inexperienced home carpenter has converted her old kitchen cupboards into convenient easy-to-use ones by making some of the accessories described in this bulletin.

Tools and Supplies

Most homes have the few tools needed for making simple shelves and racks. It is surprising what can be done with just a hammer and a saw. Additional tools will make the job easier; you may wish to buy more if you are planning to make several cupboard devices.

The following tools are considered essential for making the articles described in this bulletin:

Square
Saw—carpenter's handsaw, coping saw, or utility saw
Wood file with handle
Hammer
Rule—folding, steel tape, or yardstick
C-clamps

The wood from orange or other crates is suitable for making most of the cupboard accessories, provided the pieces of wood are the size you need. Or you can buy softwood, ½ inch thick, which is easy to work with and is suitable for the end pieces of many of the shelves and racks. Plywood, ¼ inch thick, may be used for the lengthwise boards of shelves and racks but, if used for the end pieces, it should be at least ½ inch thick. Lattice stripping in 1¼- to 1¾-inch widths is suitable for many purposes as it is already cut and finished in the width needed.

Use small nails or brads with thin wood so that it will not split. An 18-gauge wire nail or brad is suitable for most crate wood. The length of nail will be determined by where it is used. A 1-inch nail or brad is suitable for many purposes.

Very rough crate wood may be sanded with coarse (No. 2) sandpaper until it is fairly smooth, then finished with a fine sandpaper (No. 2/0). If finished wood, like plywood, is used, only the finest sandpaper is needed.

General Procedure for Making Storage Devices

1. Decide on the type of storage device needed.
   Look at the pictures on the following pages for suggestions.
2. Measure the cupboard and the articles to be stored to determine the size of storage device to make. Write in the size of the rack or shelf on the picture of the article in this bulletin.
3. Decide on suitable wood for the different parts. The end pieces of shelves and racks are generally made of wood at least ½ inch thick, and the lengthwise piece may be thinner wood unless the articles to be stored are heavy.
4. Measure and mark the wood. When marking, remember that the lengthwise grain of the wood is stronger and will hold more weight than the crosswise grain. You will want to place the pattern for the device so that the strain will be borne by the lengthwise grain of the wood. Check these measurements carefully to be sure the device will fit the articles to be stored and the place in the cupboard where the device is to be used.

5. Saw the wood along the marked lines.
6. With a wood file and sandpaper smooth the cut edges of the wood but do not round them.
7. Nail the pieces of wood together. The joints may be glued before they are nailed to make them stronger.
8. Paint or finish like the cupboard or wall where the storage device is to be used.

Shelves

Narrow shelves may be added where the present shelves are far apart. These shelves may be held in place by:

1. Narrow strips of wood nailed in place (These are called cleats.)
2. Metal brackets or angle irons
3. Large screw eyes placed so that the shelf will rest on the flat surface of the screw eyes
4. Pegs inserted in holes bored in the side of the cupboard
5. Adjustable metal shelf standards and supports

Shelves 8 to 10 inches apart may have one narrow shelf in between. If shelves are 12 or more inches apart, two narrow shelves may be added. The articles to be stored in the space will determine the width of the shelves and the distance they are apart. (Figure 1.)

Narrow shelves also may be added between the counter top and the upper cupboards. If two are built, the upper shelf may be wider than the lower.

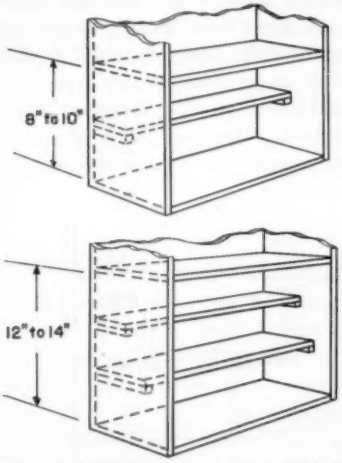

Figure 1. Narrow shelves between existing shelves that are far apart

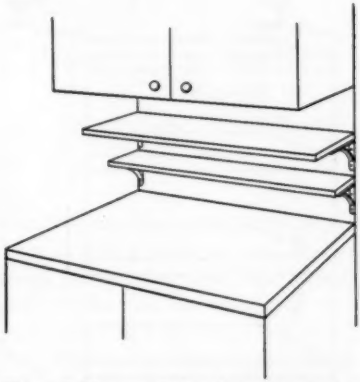

Figure 2. Narrow shelves between counter and upper cupboard

Canisters or other frequently used articles may be stored on these shelves so that they will be easy to reach yet not interfere with the using or cleaning of the work surface. (Figure 2.)

Hanging Shelves

Two shelves may be fastened to end pieces and hung in the easy-to-reach space between the work counter and upper cupboards. The lower shelf should be narrower than the upper one. The end pieces may be shaped to conform to the width of the shelves. Fasten these shelves to the upper cupboards with flat strips of metal, with angle irons, or with screw eyes and hooks. These hanging shelves are very convenient at a mix center to store frequently used articles such as seasonings and measuring cups. (Figure 3.)

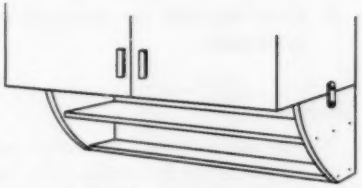

Figure 3. Hanging shelves under cupboard

A hanging shelf with several shelf divisions may be hung on a wall or a door. This type of shelf can be placed at the range to hold supplies used there first. Such a shelf may also be hung on a wall to hold cookbooks or other supplies. (Figure 4.)

An extra shelf may be hung on the underside of a shelf in an upper cupboard where the original shelves are far apart and where the added shelf is not to be as long as the cupboard shelf. Fasten the shelf in place with angle irons or with screw eyes and hooks. A wide, low shelf of this type may be used for a platter—a narrow one for cups or glasses. (Figure 5.)

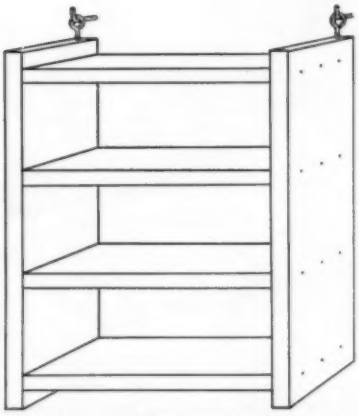

Figure 4. Hanging shelf for wall

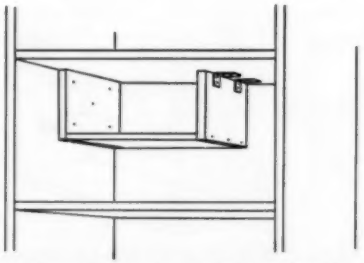

Figure 5. Hanging shelf in cupboard

Cut-out Shelves

Existing wide shelves may be cut out to provide one-row-deep storage space. By cutting these shelves narrower you can also use racks for storage on doors. (Figure 6.) Or, this type of shelf might be used instead of a narrow one between shelves that are far apart. These shelves may be held in place with cleats, screw eyes, pegs, or brackets. Use a narrow blade saw like a coping saw for cutting out these shelves.

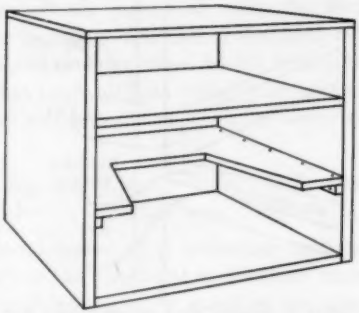

Figure 6. Cut-out shelf between shelves that are far apart

In some kitchens, there is not enough space between the work counter and upper cupboard to use the electric mixer. By cutting out a part of the bottom shelf of the cupboard and working with the cupboard door open, you will have room on the counter to use the mixer. This will also provide added counter space when work surface in the kitchen is inadequate. (Figure 7.)

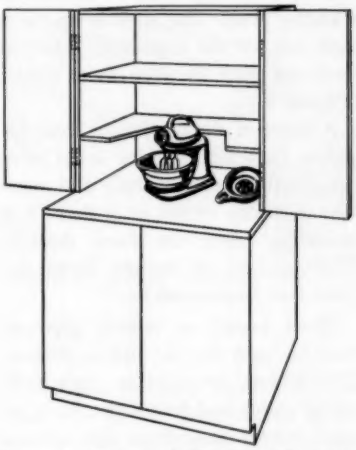

Figure 7. Cut-out shelf to provide space for mixer

Sliding Shelves

Under-counter shelf storage space is frequently too deep to be convenient. To make this space easier to use, construct a sliding shelf to rest on top of the existing shelf and be held in place with a wooden cleat. The added shelf may have a hole cut in it, or a metal handle may be screwed to the front edge so the shelf will be easy to pull out. When this shelf is pulled out, the articles stored there are easy to see and grasp. This type of shelf is better adapted for storage of lightweight articles than for heavy ones. (Figure 8.)

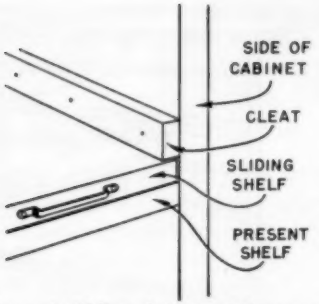

Figure 8. Sliding shelf on stationary one

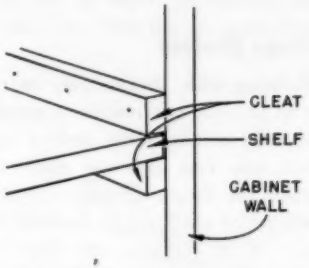

Figure 9. Sliding shelf held in place with cleats

If the existing shelf is not fastened in too tightly, it may be made into a sliding shelf. The shelf is first removed. Then two cleats are fastened on each side of the cupboard. They are placed just far enough apart so the shelf can slide between them easily and yet not tip when it is pulled out. (Figure 9.)

A series of sliding shelves close together may be used for linen storage. With one tablecloth and napkins to match stored on a shelf, it is easier to select the linen desired. This method of storage keeps the linen free from wrinkles.

Hard board or ¼-inch plywood may be used for the sliding shelves. The shelves are held in place with cleats above and below the shelf, or solid boards as wide as the distance between the shelves may be used. (Figure 10.)

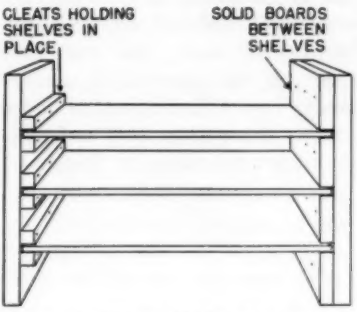

Figure 10. Sliding shelves close together for linen storage

Removable Shelves

Removable shelves are easy to make and may be used for many purposes. They are especially convenient in old cupboards, metal cupboards, and cupboards in rented homes. The top and end supports may be made of the same wood or the top board may be made of thinner wood if the weight of the articles to be stored is not too great. The end pieces should be made of wood that is at least ½ inch thick. Angle irons or an extra piece of wood

fastened on the underside of the shelf at the joint will make the shelf stronger and keep the end pieces from buckling. The size of the shelf will be determined by the articles to be stored and the place where it is to be used. A shelf 4 inches wide and 15 inches long will hold twelve juice glasses. If this shelf is 5½ inches high, average size water glasses can be stored on the shelf underneath.

A shelf 7 inches wide, 10 inches long, and 5 inches high will fit over a stack of twelve dinner plates and will hold a vegetable bowl. (Figure 11.)

A small removable shelf may be placed on top of a larger one to form a step shelf. These are convenient when the cupboard shelves are more than 10 inches apart and when small articles are to be stored in the cupboard. This is a particularly handy arrangement where two shelves of different lengths are needed. (Figure 12.)

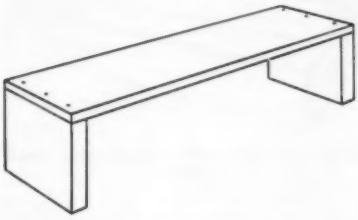

Figure 11. Removable shelf

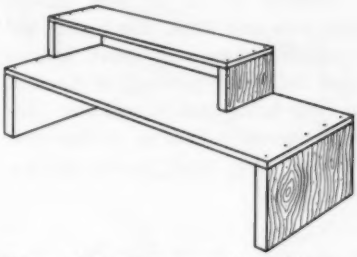

Figure 12. A small removable shelf set on a large one

Step Shelves

Two or more shelves of different widths can be built together. These are good to set on cupboard shelves that are 10 or more inches apart. For instance, such step shelves, set over a stack of plates, will provide convenient storage for saucers and small dishes on the lower shelves and cups on the narrower top shelf. With this arrangement, you would not need to handle the cups and saucers to get at the dinner plates.

The top board of the step shelf is nailed to the top of the end pieces. The lower shelf may rest on cleats on the end pieces or on angle irons. Or if the wood is thick enough, this shelf may be fastened in permanently with nails or screws. Measure carefully when marking the wood for the shelves as they need to be of different lengths. The lower shelf board is shorter than the top one. Determine the length of the lower shelf board by subtracting the thickness of the two end pieces from the length of the top shelf board.

If cleats are used to hold the lower shelf in place, they should be nailed in before the top board is nailed. (Figures 13 and 14.)

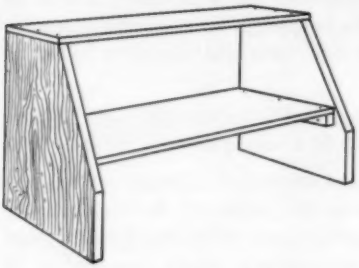

Figure 13. Step shelf

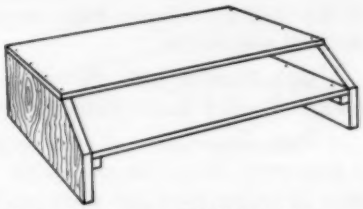

Figure 14. Low step shelf for platters or bowls

Another design for step shelves resembles stair steps. The boards between the steps keep small articles from falling off the back of the shelf or from being pushed under it. This is a convenient shelf to use for spice cans or other small, unlike articles. (Figure 15.)

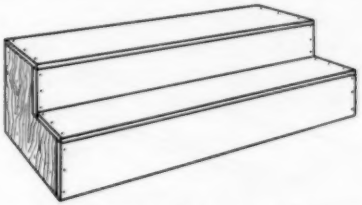

Figure 15. Step shelf for spices or small articles

Racks

Racks may be used to hold spice cans, glasses, trays, garbage cans, cookbooks, and many other kitchen supplies, tools, and equipment. Racks may be put on little doors, big doors, or on the wall. Make the rack of any size, shape, and design so that it will fit the article to be stored and the space where it is to be used. These racks may be made either of strips or of solid pieces of wood.

The weight of the articles to be stored on the rack will determine the thickness of the wood. For example, thin wood may be used for a spice rack but heavier wood will be needed for a rack for cookbooks or for a garbage can. However, in most cases the end pieces need to be heavier than the lengthwise boards in order to hold the nails well and make a strong rack.

Racks on cupboard doors must be shorter than the width of the door to allow for opening and closing the door. The racks also need to be placed so that they will be between the shelves when the doors are closed. Narrow or cut-out shelves may be used in cupboards to allow space for racks on doors.

When you design the rack, plan to have the front of it placed high enough so that the stored articles will not fall out when the door is opened and closed. Use a narrow strip of wood or wire spring for the front of spice racks. Place the strip or spring so the labels on the cans may be seen.

Racks may be held in place with screws, small angle irons, or screw eyes and hooks. If screws are used, a hole is bored through the narrow upper part of the end pieces. When a heavy article such as flour or sugar is stored on a rack, it may be necessary to fasten the rack on the door with screws and to brace the rack with an angle iron at the bottom. The door on which a heavy rack is fastened may also need an extra hinge to keep the door from sagging. (Figures 16, 17, 18, 19, 20, 21.)

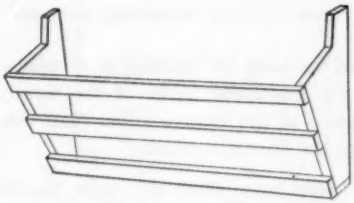

Figure 16. Wall or door rack

Figure 17. Door rack for glasses

Figure 18. Door rack for spices

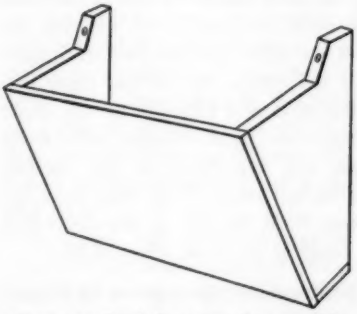

Figure 19. Rack for paper bags or lids

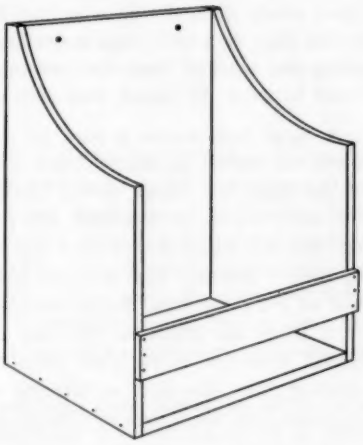

Figure 20. Large door rack for garbage can

Racks for Cutlery

Even though racks for cutlery may be purchased for a small sum, it isn't always possible to find one that exactly suits your knives or the place where you want to use the rack.

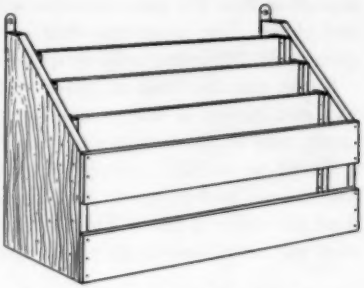

Figure 21. Rack for platters and trays

A very simple knife rack may be made from orange crate wood. (Figure 22.) From one of the ends, cut a strip 1½ inches wide and as long as is needed to hold the knives you wish to store. The rack is shaped narrower at the ends so that screws may be used for holding it in place. The length of the rack should be on the lengthwise grain of the wood. Cut a board 1 inch wide from a side piece of the orange crate. Nail this board across the front of the rack to keep the knives in place.

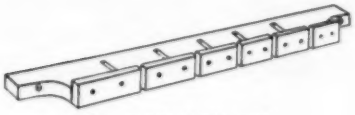

Figure 22. Knife rack

Slots into which the knife blades fit are cut from the front to within ½ inch of the back of the rack. The slots must be far enough apart to allow space for grasping the handles of the knives. Mark lines ¼ inch apart where each slot is to be cut. Fasten the rack in a vice, or clamp it to the edge of a table with a C-clamp to hold it firmly while sawing. Saw along the marked lines for each slot; then remove the narrow strip of wood between the sawed lines with a chisel, screw driver, or nail.

A cigar box makes a rack in which the knife blades are protected. From the end of an orange crate, cut a block of wood the size of one end of the cigar box. Mark on the block of wood the position of the slots for the knife blades as described above. Set the cigar box on end and open out the lid. Place the marked block on the upper end of the cigar box in such a position that you can saw the slots and the end of the cigar box at the same time. Before sawing, fasten the block in place with nails. Nail from the inside so the nail heads will not show on the outside. Check carefully to be sure there will be no nails where the slots are marked. Saw the slots as directed above. Nail the lid of the cigar box in place. Use screw eyes and hooks for hanging the rack. (Figure 23.)

A narrow knife rack may be made by fastening three pieces of ¼-inch plywood together. The two outside pieces of wood are solid and the

middle piece is cut out to conform to the shape of the knife blades. The rack may be rectangular or it may be shaped to fit the curve of a cabinet.

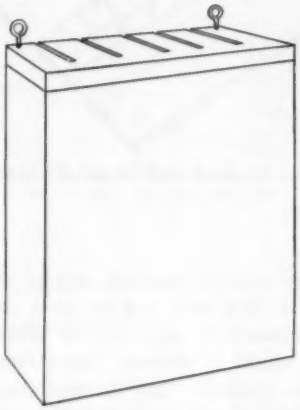

Figure 23. Knife rack made from cigar box

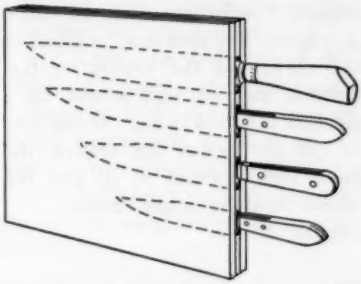

Figure 24. Plywood knife rack with straight front

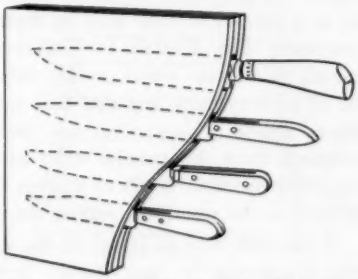

Figure 15. Plywood knife rack with curved front

Measure the longest knife blade and add an inch. This measurement will be the length of the rack. The width of the rack will be the width of the knife handles plus space between them for ease in grasping. Make a paper pattern the size decided upon and check for size by laying the knives on the pattern. Cut three pieces of plywood the size of the pattern. Lay the knife blades on one piece of wood and mark around the blades. Saw along the marks with a coping saw. Glue the three pieces of wood together with the slotted piece in the middle. To make the rack stronger put it in a vise or weight it down with a heavy object until the glue sets. With four wire brads or nails fasten the rack vertically to the side of the cupboard or horizontally under a shelf or an upper cupboard. (Figures 24 and 25.)

A slotted strip of wood may be used for storing knives or other tools in a drawer. Cut a strip 1½ inches wide from wood at least ¾ of an inch thick and as long as the drawer is wide. Cut the slots 1 inch deep and space them so that the handles of the tools are easy to grasp. The width

of the slot will be determined by the tool to be stored in it. For instance, the handle of a wooden spoon will require a wider slot than the blade of a knife. The rack may be glued to the bottom of the drawer or fastened at the ends with screws. Or a piece of plywood or hard board may be cut the size of the drawer, the knife rack fastened to it, and the whole thing set in the drawer. (Figure 26.)

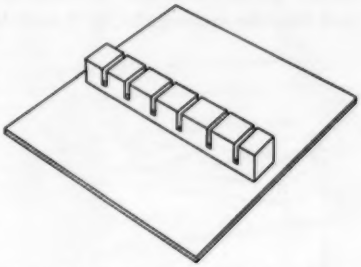

Figure 26. Knife rack for use in a drawer

Files

Vertical and horizontal files provide storage for shallow articles that cannot be stacked. These files may be built as a unit and set on a shelf or in a drawer or they may be built in permanently if removable dividers are used. The dividers for files may be made of plywood, hard board, metal, thin crate wood or any other thin material. The dividers should be of such a shape and size that they will not interfere with grasping the stored article. The dividers may be held in place by solid pieces of wood between them, by narrow strips of wood, pieces of quarter round molding, or a series of brads or staples. Or, if you have the tools, you may cut grooves in the wood for holding the dividers.

A pan file may be made of the wood from an orange crate. The heavy end pieces may be used for the bottom and the back. The side pieces of the crate may be used for the dividers. (Figures 27, 28, 29.)

In some cases it may be desirable to plan to store two or more like articles, such as pie pans, in one section of the files. When this is done,

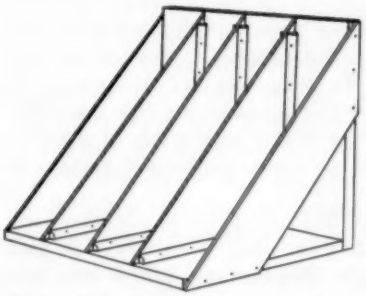

Figure 27. File made from orange crate

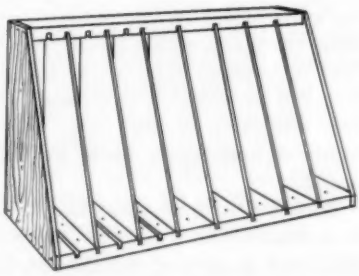

Figure 28. File with no back piece

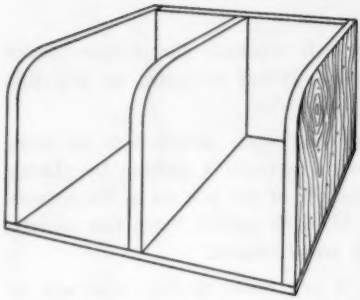

Figure 29. Large file for dishpan and drainer rack or two dishpans

it is necessary to have the space large enough so that one pan can be removed without taking all of the pans out and then replacing the ones that are not needed.

A file may be built like a box without a bottom and set on a shelf or down in a drawer. The dividers should not extend so close to the front of the shelf or to the top of the drawer as to interfere with grasping the articles stored there. (Figures 30 and 32.)

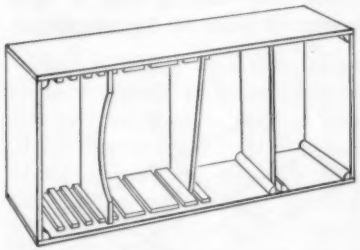

Figure 30. A movable storage file with upright partitions

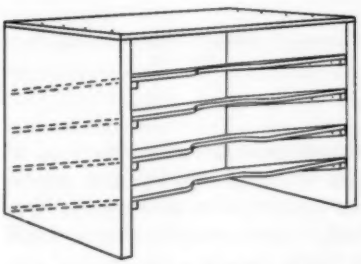

Figure 31. Slanting horizontal file

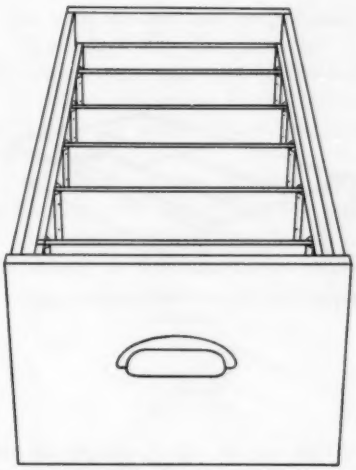

Figure 32. A deep drawer made into a file box

A slanting horizontal file may be used for platters that are too wide to set on a shelf. Narrow cleats are used to hold the dividers in place. (Figure 31.)

Drawer Dividers

Dividers or partitions in a drawer will separate the articles stored there. You may use plywood, hard board, lattice stripping, or any thin wood for the dividers.

It is important to plan carefully so that each article will fit easily into its own compartment. You may wish to make a pattern by placing all of the articles on a piece of paper the size of the bottom of the drawer. Mark on the paper the space required for each article. From this pattern, it will be easy to measure the length of wood needed.

The drawer will be easier to clean if you make dividers that are removable. One way is to make a frame the size of the inside of the drawer with dividers fastened into the frame. If a frame is not used, small cleats that are nailed to the side of the drawer may hold removable dividers in place. The dividers may be held in place with masking tape, if lightweight articles are to be stored in the drawer. (Figures 33, 34, and 36.)

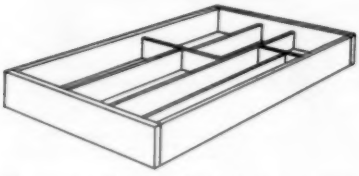

Figure 33. Drawer divided into uneven sections

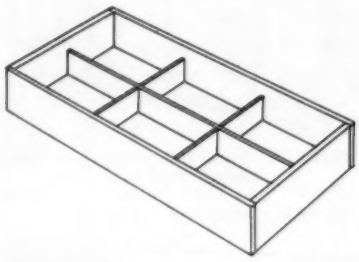

Figure 34. Drawer divided in six equal sections

The way in which you divide the drawer will determine the kind of wood best suited for the dividers. If the drawer is divided into uneven sections, it is better to use lattice stripping, the sides of an apple box, or some other wood at least ¼ inch thick so that you can glue and nail the partitions to each other at the inside joints.

To separate a drawer into equal sections, as in figure 34, cut one piece of hard board or plywood the length of the drawer and two pieces the width of the drawer. Mark and cut slots one-half the height of the dividers at the point where they cross each other (figure 35) so they will fit together.

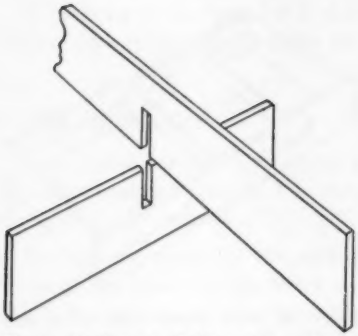

Figure 35. Slots in dividers that are to be fitted together

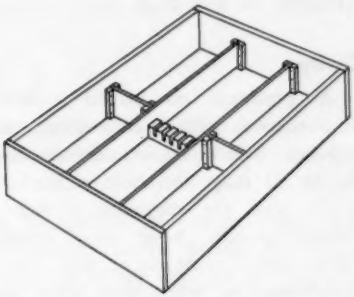

Figure 36. Drawer divided into equal sections with knife rack in center

Sliding Trays

Shallow sliding trays may be made for both shallow and deep drawers to use the space to better advantage. These trays may slide from side to side or from front to back. A tray generally covers one-third to one-half of the drawer space to permit access to the articles stored in the bottom of the drawer. The tray may be used for storing small articles that will not interfere with opening and closing the drawer.

The sides of the tray may be made of lattice stripping or other fairly thin wood. Thin plywood is not good for the sides since it will not hold well where it is nailed together at the corners. Plywood, hard board, or other thin wood may be used for the bottom of the tray. Lattice stripping or other narrow wood may be used for the runners on which the tray slides.

Determine the depth of the tray, allow some clearance at the top, and nail the runners in place on the sides of the drawer. Cut the bottom of the tray and fit it into the drawer to see that it slides easily. Fit and cut the four sides of the tray. Plan them so that the pull will be against the nail at the corners. For example, in a tray that slides from front to back, the pieces at either side will extend over those at the front and back. Nail the four sides of the tray together at the corners;

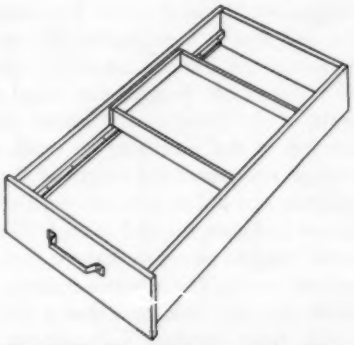

Figure 37. Narrow drawer with sliding tray

then nail the bottom to the sides. (Figures 37 and 38.)

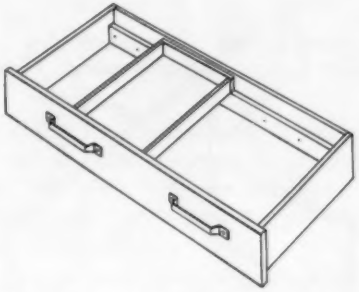

Figure 38. Wide drawer with sliding tray

Dolly

A platform on swivel casters known as a dolly is convenient for moving heavy objects about the house. It may also hold a bucket while you are mopping a floor. Many women have also found them useful to sit on as they wash baseboards or when they wipe up the floor by hand.

Make the platform from a piece of 5-ply plywood or two ends of an orange crate screwed or nailed together with the grain running in different directions. Fasten each caster in place with four screws. Triangular blocks of wood may be nailed on the top corners of the platform to keep the bucket from falling off. (Figure 39.)

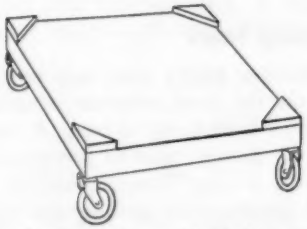

Figure 39. A movable platform

Sink Rack

Many sinks are too low to work at comfortably. You can make a rack to set under the dishpan to give you a better working height. To determine the height of the rack, turn a pan upside down under the dishpan or set the dishpan on blocks of wood. Experiment with different heights until you find the one that is comfortable for you. The rack should be as large as the bottom of the dishpan. Make the upright pieces of the rack from the end of an orange crate or any other wood that is at least ¾ of an inch thick. The grain of the wood should extend the length of the board. The slats across the top of the rack may be made of thinner wood but should be strong enough to support the weight of the dishpan and dishes. Use two nails or screws to fasten the end of each slat to the upright pieces so that the rack will be strong. Use a water-resistant finish on the rack to prevent the wood from getting water-soaked. (Figure 40.)

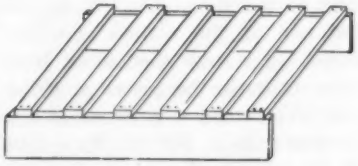

Figure 40. Sink rack

If the sink is too high for a child who washes dishes, you may make a similar rack with a solid top for the child to stand on.

Towel Racks

It is sometimes difficult to find a towel rack that will fit the space in which you want to put it. You can make one from the end of an orange crate and a broomstick.

Cut the end pieces of the rack from the end of an orange crate. Cut them so the grain of the wood will be parallel to the surface to which the rack is to be fastened. Shape the end pieces of the rack narrow enough to be fastened to the wall with screws. Cut the bar the desired length from a broomstick; or use ½-inch doweling for the bar, if you prefer. In the end pieces bore holes the size of the bar. Practice boring holes in scrap wood first to be sure that you use the correct size bit. The rack will be more attractive if the holes are bored only halfway through the wood, but it will be stronger if the holes are bored all the way through. Glue the bar into the end pieces. Check carefully before the glue hardens to see that the end pieces are straight (Figure 41.)

Figure 41. Towel bar

A sliding towel rack is difficult to make, yet provides easy access to towels stored under the work surface. (Figure 42.) You may wish to use oak or some other hard wood for durability. The 8-inch-long towel bars are made of ½-inch doweling and glued in place. The different parts of the rack are held together with screws.

For a rack 18 inches long you will need: one board 6 inches wide, 18 inches long; one board 4 inches wide, 18 inches long; three boards 2 inches wide, 18 inches long; two boards 1 inch wide, 18 inches long; 1 piece ½-inch doweling, 48 inches long.

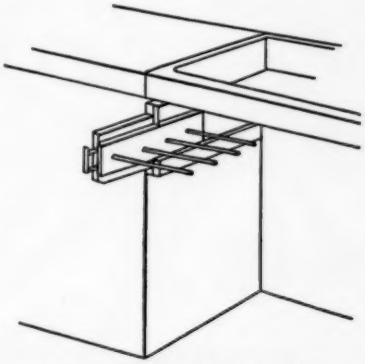

Figure 42. Sliding towel rack

A publication of the
New York State College of Home Economics
a unit of the State University of New York,
at Cornell University

Published by the New York State College of Home Economics at Cornell University, Ithaca, New York. M. C. Bond, Director of Extension. Published and distributed in furtherance of the purposes provided for in the Acts of Congress of May 8 and June 30, 1914.